

Missouri River Basin Watersheds



Why is it important?

Overall, significant problems and stressors to fish, bugs, and aquatic life exist in watersheds within the Missouri River Basin in southwestern Minnesota. Fish and other river life struggle because habitat conditions are mostly fair to poor throughout the Upper Big Sioux River, Lower Sioux River, and Little Sioux River watersheds located in Lincoln, Pipestone, Rock, and Nobles counties.

Biological monitoring looks at fish and macroinvertebrates (e.g. insects, crayfish, snails, clams) to assess the health of water. By examining a stream's biological health, scientists and local partners can determine the impact of human changes on aquatic resources.

Upper Big Sioux River, Lower Big Sioux River, and Little Sioux River watersheds flow into the Big Sioux River toward Iowa and eastern South Dakota. The primary land use is cropland, followed by rangeland and urban development a distant third. Also within the Missouri River Basin in southwestern Minnesota, a similar report on the Rock River has a separate summary.

Key issues

In simple terms, stressor identification is a scientific process of identifying the major factors causing harm to fish and other life in streams. The five major elements of a healthy stream system are stream connections, hydrology, stream channel assessment, water chemistry, and stream biology. If one or more of the components are unbalanced, the stream ecosystem may fail to function properly and is listed as an impaired waterbody. Stressor identification is a key component of the major watershed restoration and protection projects being carried out under Minnesota's Clean Water Legacy Act.

Scientists have identified the following as probable causes of stress for aquatic life in these watersheds:

- Low dissolved oxygen levels
- High phosphorus and high nitrate levels
- High suspended solids (primarily sediment)
- Lack of habitat

Highlights of report

Specific subwatersheds assessed:

- Medary Creek, the only primary subwatershed in the Upper Big Sioux, streams fail to support as many fish and aquatic insects as they should. Stressors: high phosphorus, high nitrates, lack of habitat.
- Little Sioux and Ocheyedan rivers, streams fail to support as many fish and aquatic insects as they should. Stressors: Low dissolved oxygen, high phosphorus, high nitrates, high sediment, lack of habitat.
- Lower Big Sioux subwatersheds, streams fail to support as many fish and aquatic insects as they should: Beaver Creek, Blood Run, Flandreau Creek, Pipestone Creek, Split Rock Creek, and Spring Creek. Stressors: Low dissolved oxygen, high phosphorus, high nitrates, high sediment, lack of habitat.

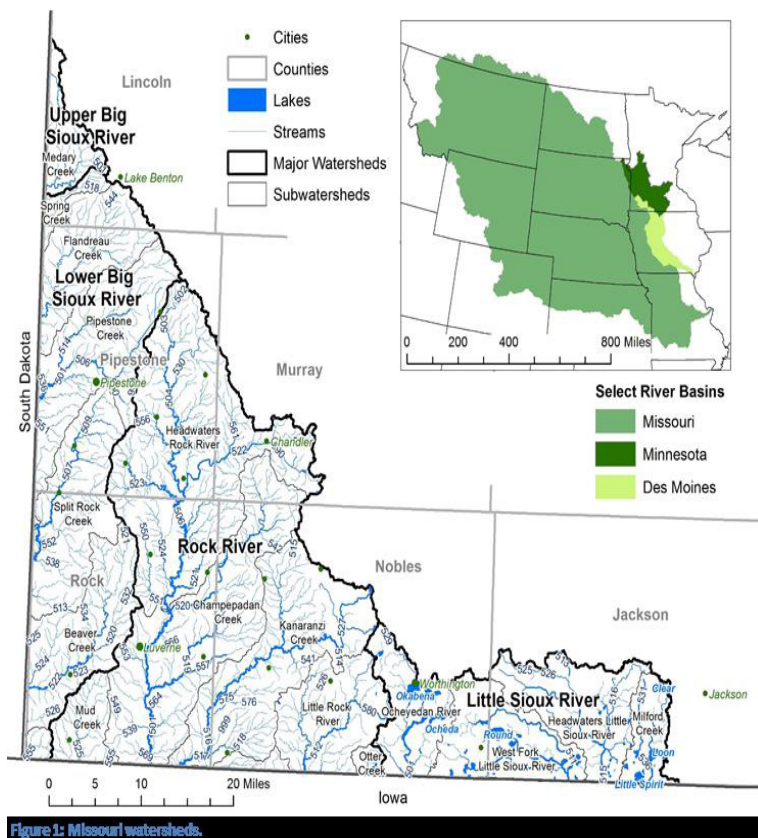
Highlights (cont.)

Habitat conditions will improve by increasing the immediate riparian area and limiting livestock access to the stream. Stabilizing the stream banks, planting cover crops, and adopting rotational grazing will also help limit the amount of sediment entering the stream, which covers the sand and gravel stream beds preferred by many types of sensitive fish species.

A large scale plan to reduce phosphorus levels is greatly needed. This should include efforts to improve the timing and rate of fertilizer application, as well as increasing the presence and width of riparian buffers. Elevated nitrate values are also a concern. Reducing the application time and rate, and improving the riparian buffers, will greatly improve the nitrate conditions.

About this study

Stressor identification began as part of an intensive water monitoring effort in these watersheds dating back to 2011. Data also included water chemistry data within ten years. Upper Big Sioux: Two biological monitoring sites. Little Sioux: 26 biological monitoring sites and 22 chemistry-monitoring stations. Lower Big Sioux: 31 biological monitoring sites and another 18 biological monitoring stations sampled in previous years.



Full report

To view the full report, go to www.pca.state.mn.us/sites/default/files/wq-ws5-10170202c.pdf or search for the desired watershed on the MPCA website.

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